APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE.

REG. NO. 30091421

A Dissertation submitted to
The Tamilnadu Dr. M.G.R. Medical University,
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In partial fulfillment of the requirement for the
Award of the Degree of

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APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE.

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Abstract

An interventional study was conducted to findout the effect of acupressure during dysmenorrhoea. Quasi experimental one group pretest - posttest design was used to conduct the study. Fifty nursing students were selected as samples conveniently. Acupressure was applied on the SP_6 and Li_4 point for 25 minutes. Numerical pain intensity scale was administered to assess the pain before and after acupressure. Descriptive statistics and inferential statistics were used to analyse the data. The results show that there is a significant decrease in pain after acupressure. Hence it can be concluded that acupressure is a cost effective non pharmacological intervention that contributes for pain reduction during menstruation.

Application of Acupressure on Pain among Nursing Students with Dysmenorrhoea at Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore.

Menarche is part of a complex process of physical and emotional development. It occurs late in puberty after most of the growth in height is complete and after most of the development of secondary sex characteristics has occurred. The initiation of menstruation in adolescent girls, normally occur between the ages of 11 and 15. The age at menarche has become younger in Western countries, possibly associated with a better general standard of nutrition, and is later in less developed countries.

Dysmenorrhoea is a cyclical lower abdominal or pelvic pain, which may also radiate to the back and thighs, occurring prior to or during menstruation, or both. Dysmenorrhoea can be severe enough to limit a woman's normal activities and require medical attention. She may also experience other symptoms such as nausea, vomiting, heart palpitation, sweating and headache. Usually, the pain starts at the beginning of the period lasting for a few hours, but in some women it may continue for several days.

Most of the females experience some degree of pain and discomfort in their menstruation period which would have important impact on their daily activities and disturb their productivity at home and work place. The prevalence of dysmenorrhoea is very high and at least 50% of women experience the problem throughout their reproductive years.

Dysmenorrhoea, pain during or starting before menstruation is one of the most common gynaecological problems in women of all ages. Many adolescents have dysmenorrhoea in the first 3 years after menarche. Young adult women ages 17 to 24 years are most likely to report painful menses. Between 30% and 40% of women report mild to moderate level of discomfort associated with menses, and 7% to 15% report severe dysmenorrhoea. It has been estimated that upto 10% of women with dysmenorrhoea have severe enough pain to interfere with their functioning for 1 to 3 days a month (Lowdermilk, 2000).

A wide variety of pharmacological measures are used to relieve pain during menstruation but several studies indicate that the pharmacological agents creates harmful effects on the women's health status. Therefore the health professional must explore alternative approaches to provide better care and promote healthy atmosphere. A variety of non pharmacological measures are used for relaxation and pain relief which includes breathing techniques, touch and massage, music therapy, application of heat and cold, acupressure and acupuncture (Gurates, 2004).

Acupressure is one of the popular and ancient alternative and complementary therapies. This technique is widely used for various problems and has more effectiveness. This technique also can be used in menstruation, pregnancy, labour and postpartum. It is related to the flow of energy within the body which occurs along specific pathways or meridians and to restore balance within these where necessary. A hundreds of sensitive acu points have been located along these meridians. Acupressure point called SP_6 point and Li_4 point is used for menstrual pain (Wang, et al., 2006).

Acupressure can be adopted as a nursing intervention to alleviate dysmenorrhoea that improve productivity, creativity, work performance and quality of life (Pirotta, et al., 2006). It is a healing art using the fingers by skillfully pressing the points. Stimulating these points with pressure triggers the release of endorphins, which are the neurochemicals that relieve pain. As a result, pain is blocked and the flow of blood and oxygen to the affected area is increased, and causes the muscles to relax.

1.1. NEED FOR THE STUDY

Dysmenorrhoea may affect upto 75% of women in the world and 5-6% may have incapacitating pain. The pain is usually experienced in lower abdomen but may extend to the back and thighs. In India, dysmenorrhoea occurs in 50% of menstruating women and about 10% are incapacitated for 1-3 days each month.

Dysmenorrhoea is the leading cause of recurrent short term absence from school in adolescent girls and a common problem for women of the reproductive age (French, 2005). The common complaint among women is cyclical pain associated with menstruation. It is a very common condition, more than 90% of women experience pain during menstruation. Typically the pain starts few hours before or at the onset of menstruation and last for 48-72 hours. The affected girls have cramps in lower abdomen along with backache (Campbell, 2008).

Dysmenorrhoea refers to the syndrome of painful menstruation. Its prevalence is estimated at 25% of women and upto 90% of adolescents. No significant difference exists in prevalence of incidence between races, though the most common causes of dysmenorrhoea differ by age. Although it is not life threatening, dysmenorrhoea can

be debilitating and psychologically a burden for many women. Some choose to self medicate at home and never seek medical attention for pain. Dysmenorrhoea is responsible for significant absenteeism from work, and it is the most common reason for absenteeism school from among adolescents (Lowdermilk, 2000).

In a Taiwanese study, 69 young women were given 20 minutes of either acupressure or bed rest. Therapists pressed the point SP_6, located three cun above the ankle bone on the inside of the leg in the center. Thumb pressure was applied for 6 seconds, released for 2 seconds, and repeated during 5 minutes cycles on each leg. The women who received acupressure reported, feeling 40% less pain, compared with a 26% reduction for those on bed rest.

Current treatments for dysmenorrhoea include bed rest, exercise, heat, herbs, drugs, bio-feedback, surgery, transcutaneous electrical nerve stimulation, acupuncture, acupressure and analgesic medication. It has been reported that dysmenorrhoea can be successfully relieved by acupressure at the combination of acupoints SP_6, Li_4 and SP_{10} (Wei, 2001).

The above cited literature evidences, tapped an insight in the researcher's mind which paved the way to conduct this experiment. Acupressure was found to be an effective pain relieving mechanism, applied for various pains. Hence, the researcher tends to conduct the study among nursing students during the painful menstruation.

1.2. STATEMENT OF THE PROBLEM

APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE.

1.3. OBJECTIVES

1.3.1. Assessment of pain among nursing students with dysmenorrhoea.

1.3.2. Application of acupressure on pain among nursing students with dysmenorrhoea.

1.3.3. Assessment of pain among nursing students with dysmenorrhoea after acupressure.

1.4. OPERATIONAL DEFINITION

1.4.1. Acupressure

Application of pressure in the SP_6 situated in the midpoint four fingers above the tip of medial malleolus bone for 20 minutes, Li_4 point situated over the junction between the thumb and the index finger for 5 minutes during first day of menstruation among nursing students.

1.4.2. Pain

It refers the pain experienced during menstruation by the nursing students.

1.4.3. Dysmenorrhoea

It is a cramping abdominal pain with menstrual flow associated with vomiting, nausea, head ache, back ache, diarrhoea and constipation experienced by nursing students.

1.5. CONCEPTUAL FRAME WORK

Widen Bach's helping art clinical nursing theory (1964) was chosen as conceptual framework for this study. It consists of three components such as identification, ministration and validation.

(i) Identification

Nursing students those who verbalize pain during their menstrual period were selected.

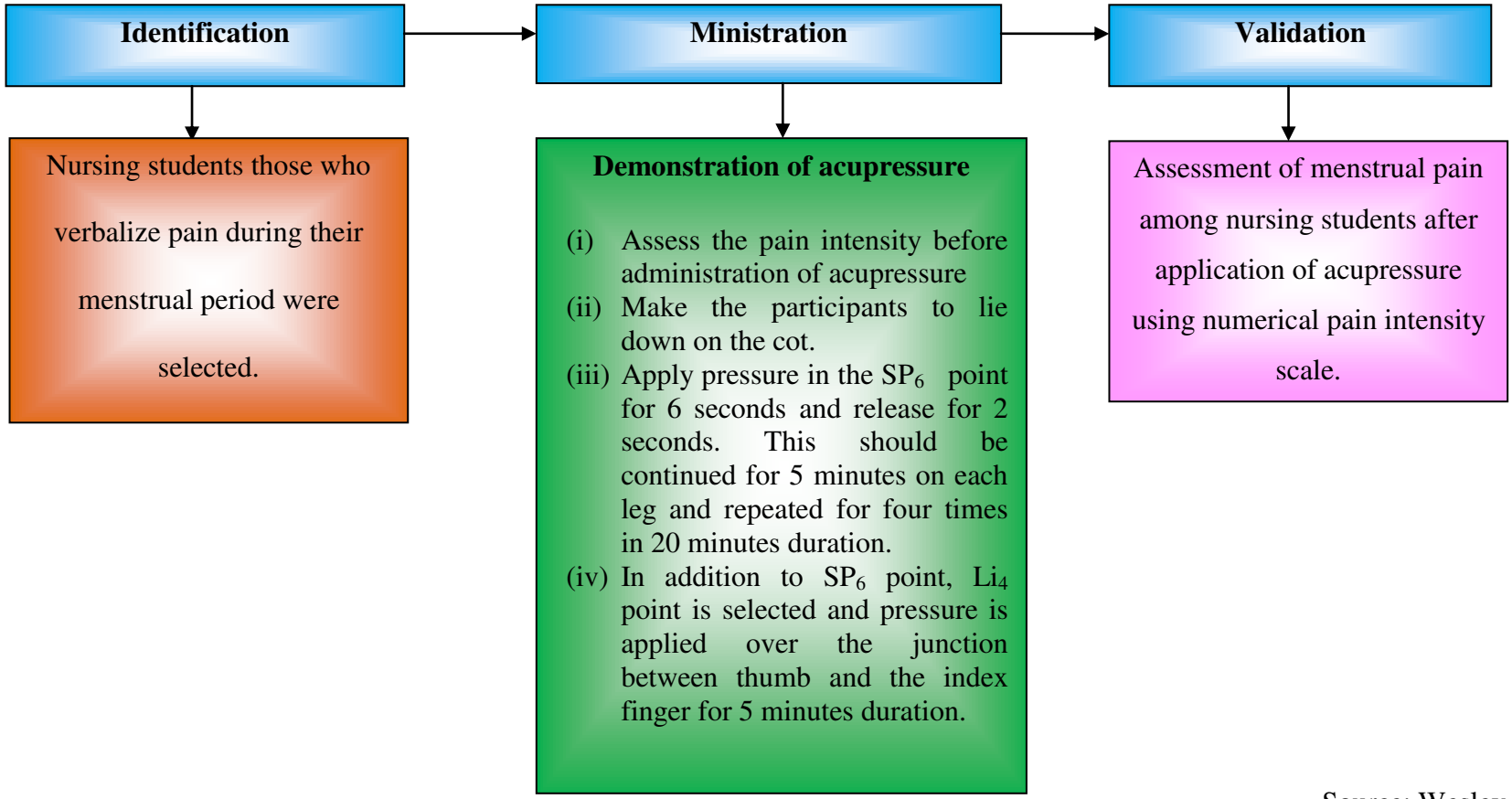
(ii) Ministration

The researcher administers pressure in the SP_6 point for 6 seconds and release for 2 seconds. This should be continued for 5 minutes on each leg and repeated for four times in 20 minutes duration. In addition to SP_6 point, Li_4 point is selected and pressure is applied over the junction between thumb and the index finger for 5 minutes duration.

(iii) Validation

In post test, the researcher assesses the pain intensity after administering acupressure using numerical pain rating scale.

FIG. 1.1.
WIDEN BACH'S HELPING ART CLINICAL NURSING THEORY (1964)



Source: Wesley, 1994

1.6. PROJECTED OUTCOME

Application of acupressure among nursing students with dysmenorrhoea will help to reduce pain and enhance comfort and relaxation.

REVIEW OF LITERATURE

The present chapter discussed about the review of literature pertinent to the study. The literature review is discussed under the following headings.

2.1. Literatures related to dysmenorrhoea.

2.2. Literatures related to pain and non pharmacological intervention.

2.3. Literatures related to acupressure and menstrual pain management.

2.1. LITERATURES RELATED TO DYSMENORRHOEA

A cross sectional study was conducted by Sharma & Gupta in 2003 among 96 girls in two different schools in the age group of 11 years to 17 years. Spasmodic dysmenorrhoea was seen in 67.0% of girls but the daily activity was hampered only in 20.0%. Out of the 96 students 73.0% were prepared psychologically. Very less students 8.0% knew only very little about the abnormalities in menstruation. This study concluded that, school going girls needed education about the abnormalities of menstruation so that they can differentiate the normal phenomenon from abnormality and report in time in case of any aberrance in the menstrual cycle.

A study conducted by Johnson (2005) to assess the knowledge level regarding the treatment of dysmenorrhoea and to identify the prevalence of dysmenorrhoea among 182 adolescents reveals that 72.7% reported “pain or discomfort” during this period, 58.9% reported decreased activity and 45.6% reported absenteeism. Among 182 participants, 15.5% had prescription medication, and only 14.7% were using non-steroidal anti-inflammatory agent without prescription. This study concluded that

effective therapeutic options for dysmenorrhoea should be a part of routine health care for adolescent girls.

In Iran, Maryam Rostami (2007) conducted a study among 85 high school girls and among these participants, 14.4% suffered from dysmenorrhoea which disturbed their daily activities and showed no signs of improvement by the use of analgesics. The study shows that there is a significant correlation between dysmenorrhoea and certain biological factors such as menarche age, severity of dysmenorrhoea and duration of menstrual flow. It was concluded that improving the knowledge about pathophysiology of dysmenorrhoea will be a more effective treatment, and it will lead to reduction in the medical and social consequences of dysmenorrhoea.

A study conducted by Tokudaa in 2007, to investigate the epidemiology of dysmenorrhoea in Japanese women in menstrual age states that among 823 participants, 15.8% reported dysmenorrhoea, and other associated symptoms include headache reported by 10.77%, 6.92% reported back pain and 5.38% reported fatigue. Among these subjects no participants with dysmenorrhoea visited a physician, while 51.5% of the women used self medication, and 7.7% used complementary and alternative medicine.

A cross-sectional descriptive study among 107 female medical students, was conducted by Amita Singh (2008) reveals that the prevalence of dysmenorrhoea was 73.83% and in this 4.67% of subjects had severe dysmenorrhoea. In this study the grades of dysmenorrhoea were 6.32% (severe), 30.37% (moderate) and 63.29 were mild. Among 107 participants 31.64% were absent from college, 8.86% missed

individual classes and 67.08% reported social withdrawal during menstruation. This study concluded that dysmenorrhoea is common among the female medical students and it is a major problem leading to absenteeism. Information about its effective management may help to alleviate the discomfort during menstruation.

Amitha Singh (2008) reveals that dysmenorrhoea is the most common of all gynecologic complaints. It affects 50% of female adolescents today. The affected women experience sharp, intermittent spasm of pain usually concentrated in the supra pubic area. Pain may radiate to the back of the legs or the lower back. Systemic symptoms of nausea, vomiting, diarrhoea, fatigue, mild fever and head ache or light headedness are fairly common. Pain usually develops within hours or at the onset of menstruation and peaks as the flow becomes heaviest during the first day or second day of the cycle.

A study conducted by Patil in 2009 among the adolescent girls in rural areas of Ratnagiri district to find out the nutritional problems and reproductive problems reveals that 41.9% of samples were anaemic, 44% of the samples suffer from dysmenorrhoea, 16.9% had irregular mensus and 38.3% had white discharge. This study concluded that majority of the girls had clinically obvious nutritional deficiency diseases. The prevalence of anaemia among the adolescent girls was found to be 41%. They suggested that to achieve the optimum health and development of the adolescent segment of the population there is a need to introduce a comprehensive adolescent health initiative at the block level.

A cross sectional study was carried out on 729 women in Turkey by Alaettin, Mustafa, Gul, & Gulsah, in 2009, to determine the prevalence of dysmenorrhoea among a group of women and its effect on their quality of life. The prevalence of dysmenorrhoea was 63.6%, the quality of life is assessed by the short form-36 scale, which contains 8 domains such as physical functioning, role physical, body pain, general health perception, vitality, social functioning, role emotional and mental health. These domains were lower in women with dysmenorrhoea when compared to women without dysmenorrhoea and concluded that dysmenorrhoea is a public health problem that affects quality of life among women.

2.2. LITERATURES RELATED TO PAIN AND NONPHARMACOLOGICAL INTERVENTION

Proctor, & Smith, (2003) conducted a prospective, randomized and controlled study among 34 subjects who are having primary dysmenorrhoea. Among these 15 subjects received interferential current application for 20 minutes and 17 subjects received transcutaneous electrical nerve stimulation for 20 minutes. This study concluded that both transcutaneous electrical nerve stimulation and interferential current appear to be effective in primary dysmenorrhoea and free from the potential adverse effects.

Beauchamp (2005) conducted a study to find the effectiveness of vitamin E on reducing menstrual cramps and decreasing blood loss during menstruation. The researcher selected 278 young women in the age group of 15 to 17 years, those who are having dysmenorrhoea. For four months participants received 200 IU of vitamin E two times per day or placebo. It was given two days before the expected date of

menstrual period and continued through the first three days of bleeding. The severity of blood loss and duration of pain were assessed at second and fourth months. This study concluded that women in the vitamin E group lost significantly less blood than in the placebo group and suggested that, treatment with low dose vitamin E is an effective means of reducing menstrual pain and blood loss among women with primary dysmenorrhoea.

Helms, et al., (2006) conducted a study among 43 women for 3 menstrual cycles with true acupuncture vs three controls at non acupressure points. This study reveals that the women whose average pain scores were halved after treatment was significantly higher in the real acupuncture group than the other groups.

A study conducted by Cochrane collaboration review in 2007 involving Chinese herbal medicine versus placebo, no treatment, conventional therapy, heat compression, another type of Chinese herbal medicine, acupuncture or massage. This study concluded that there is improvement in pain relief and self designed Chinese herbal medicine resulted in better pain relief than acupuncture, and heat compression and it is the evidence for supporting the use of Chinese herbal medicine of primary dysmenorrhoea.

Lausch (2008) stated that aromatherapy can be very helpful in relieving the pain and distress of menstrual cramps. Dysmenorrhoea can also include symptoms such as bloating and even nausea, vomiting and diarrhoea. It can be treated with a variety of drugs, including antispasmodics, prostaglandin inhibitors, and oral contraceptives. These may produce many unacceptable side effects. While in

aromatherapy essential oils are used for menstrual cramps without harmful side effects.

Eby (2008) conducted a study to evaluate the effectiveness of zinc for dysmenorrhoea. He stated that zinc is the non-steroidal anti inflammatory drug used to treat menstrual cramp and to reduce the production of prostaglandins. This study shows that 30mg of zinc for 1- 4 days before menstruation helps in preventing cramps and pain.

A study was conducted in 2008 by Lee, Choi & Buckle in Korea among 67 female college students. Experimental group received aromatherapy with topical application containing essential oils of Lavender, clary sage and rose daily, beginning one week before the onset of menstruation and ending in the first day of menstruation. The intensity of menstrual pain was 50% lower in the aromatherapy group. The author concluded that aromatherapy with topically applied lavender, clary sage and rose oil is effective in reducing the severity of menstrual cramps.

Claudia in 2009 conducted an observational study to evaluate homeopathic treatment for dysmenorrhoea among 128 women and 11 girls. Samples those who received homeopathic prescription were relieved from dysmenorrhoea in 24 months. Among these samples 46.1% of women and 45.5% of the girls were relieved from dysmenorrhoea.

2.3. LITERATURES RELATED TO ACUPRESSURE AND MENSTRUAL PAIN MANAGEMENT

Chang and Jun (2002) conducted a study to indentify the effects of SP_6 acupressure on dysmenorrhoea and level of cortisol, epinephrine and non-epinephrine. The study was conducted among 58 students and acupressure was given in the SP_6 point for 20 minutes. This study concluded that the subjective perception of dysmenorrhoea and level of norepinephrine was reduced.

Taylor, Miaskoushi (2002) developed an acupressure garment called the relief brief. The researcher tested its effectiveness in 58 women with self reported primary dysmenorrhoea. Among these 31 women in the treatment group were instructed to wear the relief brief for as long as possible, while 27 women continued their usual care. This study concluded that 90% of the women wearing the relief brief obtained at least a 25% reduction in menstrual pain. Acupressure appears to be a safe and effective non pharmacological method of menstrual pain relief.

A study was conducted to identify effects of the SP_6 acupressure on dysmenorrhoea. A total of 58 students from two universities participated in the study. Both groups were pretested before the intervention. SP_6 acupressure was provided for 20 minutes for students in the experimental group. There were statistically significant differences in the intensity of dysmenorrhoea 30 minutes after the intervention. The experimental group had a lower intensity than the control group. SP_6 acupressure reduced the subjective perception of dysmenorrhoea (Jun, 2004).

Jun (2006) conducted a study to find out the effects of acupressure on dysmenorrhoea and skin temperature changes in college students. For this study 58 eligible participants were allotted to either SP_6 acupressure group or placebo group received light touch on the SP_6 acupoint. The study concluded that there was a significant difference in severity of dysmenorrhoea between the two groups immediately after acupressure.

A randomized clinical trial study was conducted by Tadagon in 2007 to find the effectiveness of acupressure and ibuprofen on primary dysmenorrhoea among 80 girls between 18-22 years, who complained of having moderate and severe pain. The study suggest that acupressure at Sanyinjiao point can be an effective, cost free intervention for reducing pain in dysmenorrhoea and they recommend its use for self care of primary dysmenorrhoea.

Wang, et al., (2009) conducted randomized clinical trial to compare the effect of auricular acupressure and placebo adhesive patch. Study was conducted in Central College, Taiwan among 36 college students. They were divided into experimental and control group, where experimental group received acupressure and control group received placebo adhesive patch placed on the same acupoints. The results revealed that 95% of the menstrual symptoms decreased significantly after giving acupressure. This study concluded that acupressure is a noninvasive complementary therapy for women with primary dysmenorrhoea.

A study was conducted by Jui, et al., (2010) among 36 years old female patients presented with primary dysmenorrhoea and treated with Collateral Meridian Acupressure Therapy (CMAT). CMAT was performed once on the second day of

both the first and fourth menstrual period. After the complete CMAT treatment the symptoms of dysmenorrhoea recurred within 2 months. This report indicates that CMAT treatment may be effective in relieving the associated symptoms of dysmenorrhoea.

METHODOLOGY

The present study was designed to explore the effect of acupressure on dysmenorrhoea among nursing students. The methodology of the present study includes research design, setting, population, criteria for sample selection, variables of the study, material for data collection, validity of the tool, hypotheses and techniques of data analysis and interpretation.

3.1. RESEARCH DESIGN

The research design adopted to carry out the present study was Quasi Experimental One Group Pretest- Posttest Design.

3.2. SETTING

The study was conducted in Sri Ramakrishna Institute of Paramedical Sciences Women's Hostel, Coimbatore.

3.3. POPULATION

The population for the present study was nursing students with dysmenorrhoea.

3.4. CRITERIA FOR SAMPLE SELECTION

3.4.1. Inclusion Criteria

(i) Students who have painful menstruation.

(ii) Students who are studying B.Sc. Nursing programme.

(iii) Students with dysmenorrhea, who have not taken drugs for pain.

3.4.2. Exclusion Criteria

(i) Students who are dependent on drugs for the management of dysmenorrhoea.

3.5. SAMPLING

A convenient sample of 50 nursing students suffering from dysmenorrhoea were drawn as samples for the present study.

3.6. VARIABLES OF THE STUDY

3.6.1. Independent Variable

Application of acupressure is the independent variable that was deliberately manipulated by the researcher to alter the level of the dependent variable.

3.6.2. Dependent Variable

Painful menstruation is the dependent variable.

3.7. MATERIALS

3.7.1. Tools

1. Numerical pain intensity Scale (Bram Riegel, 1998).
2. Acupressure

3.7.1.1. Numerical Pain Intensity Scale

Numerical Pain Intensity Scale was found by Bram Riegel (1998) to assess the subjective pain score. In this study, it is used to assess the intensity of menstrual pain. The scale consists of sequence of numbers from 0-10 (mild to worst possible pain). This is a simple scale which requires the person to rate their level of pain intensity on a scale from no pain to pain as worst as possible. This scale is used before and after the application of acupressure.

Administration of the tool

The subject is instructed to indicate the number given in the numerical pain intensity scale based on their level of perception.

Scoring

No Pain	=	0
Mild	=	1 - 3
Moderate	=	4 - 6
Severe	=	7 - 9
Worst possible pain	=	10

3.7.2. Acupressure

Acupressure sometimes referred to as Tuina or “Push-grasp” has been used in China since before the beginning of the common era. Acupressure is a form of touch therapy that utilizes the principles of acupressure and Chinese medicine. Acupressure can be used as part of physician’s prescription, as a session of massage therapy, or as a self treatment for common aches and illness.

Interventional procedure

The total duration of the procedure was 40 minutes.

Step 1 : Assess the pain intensity before administration of acupressure.

Step 2: Make the participants to lie on the cot.

Step 3 : Feel the bony point of the inner ankle, draw an imaginary line towards the lower calf from the inner ankle. The point is approximately four finger width from inner ankle. This point is known as SP_6 point. Place the index finger and apply gradual increasing pressure.

Step 4: Apply pressure in the SP_6 point for 6 seconds and release for 2 seconds. This should be continued for 5 minutes on each leg and repeated for four times in 20 minutes duration.

Step 5: In addition to SP_6 point, Li_4 point is selected and pressure is applied over the junction between thumb and the index finger for 5 minutes duration.

Step 6: Check any discomfort for participants.

Step 7 : Tell the participants to drink 1 glass of water after the procedure.

Step 8 : Assess the pain intensity after administration of acupressure.

3.8. HYPOTHESES

H_1: There will be a significant difference in the level of pain before and after application of acupressure.

H_2: There will be a significant association between menstrual cycle interval and pain during menstruation.

3.9. PILOT STUDY

Prior to the main study a pilot study was conducted to findout the feasibility and practicability of the study. The study was conducted in Sri Ramakrishna Institute of Paramedical Sciences Women's Hostel, Coimbatore for ten days. A convenient sample of 13 subjects were selected for the pilot study. Numerical pain intensity scale

was administered to assess the pain before and after acupressure. The intervention was applied for 25 minutes.

The mean pretest score of the subjects before acupressure on day 1 was 9.8%. It was decreased to 1.9%, after application of acupressure. Thus, the significant decrease in the pain after acupressure proves that there is a positive effect on dysmenorrhoea.

3.11. MAIN STUDY

The main study was conducted to meet the objectives of the present study. The study was conducted in Sri Ramakrishna Institute of Paramedical Sciences, Women's Hostel, Coimbatore, for thirty days. A convenient sample of 50 subjects, were selected for the main study. The data was collected from the participants and the intensity of pain was assessed using numerical pain intensity scale before the intervention. Acupressure was applied for a duration of 25 minutes in the appropriate pressure points mentioned in the interventional procedure. Pain was reassessed to evaluate the effect of acupressure.

3.12. TECHNIQUES OF DATA ANALYSIS AND INTERPRETATION

Descriptive and inferential statistics were applied to analyse the data.

DATA ANALYSIS AND INTERPRETATION

The study was intended to findout the effect of acupressure on dysmenorrhoea among nursing students. Data was collected from 50 undergraduate students. The findings were tabulated, analysed and interpreted in this chapter. The data was computed using descriptive and inferential statistics.

SECTION – I

4.1. SOCIODEMOGRAPHIC CHARACTERISTICS

The socio demographic characteristics such as age and education level of respondents were tabulated.

TABLE 4.1
DISTRIBUTION OF RESPONDENTS BY DEMOGRAPHIC DATA

(N= 50)

Demographic Data	No. of respondents	Percentage (%)
Age in years		
18	10	20
19	17	34
20	11	22
21	10	20
22	2	4
Placement (B.Sc (N))		
I year	12	24
II year	11	22
III year	14	28
IV year	13	26

Data presented in table reveals that the majority of the respondents (ie) 34% of the students were 19 years old, 22% of the students were 20 years old, 20% of the students were 18 years and 21 years old respectively and 4% of the students were 22 years old.

The distribution on placement of B.Sc nursing students reveals that, 28% of the students were in III year, 26% of the students were in IV year, 24% of the students were in I year and 22% of the students were in II year.

FIG. 4.1.
DISTRIBUTION OF RESPONDENTS BY AGE

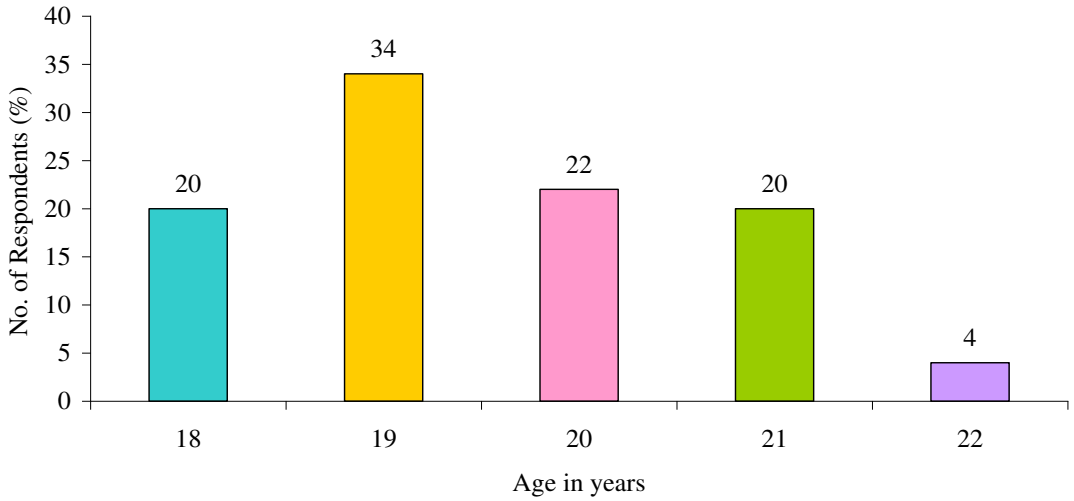
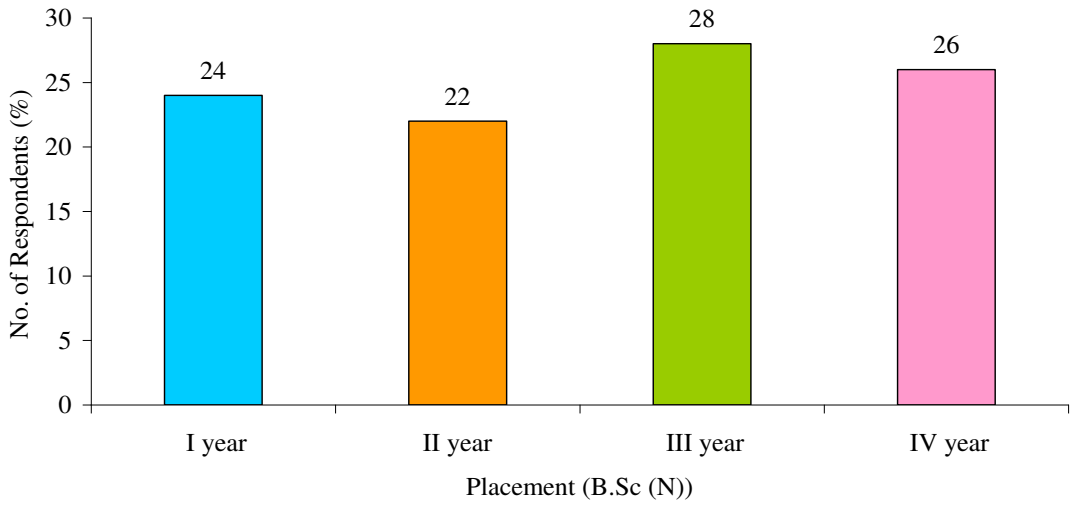


FIG. 4.2.
DISTRIBUTION OF RESPONDENTS BY PLACEMENT



SECTION – II

4.2. MENSTRUAL HISTORY

Menstrual history of respondents was collected based on age at menarche, duration of menstruation, interval between menstrual cycle, nature of bleeding, onset of pain, severity of pain, duration of pain and descriptive analysis was done.

TABLE 4.2.
DISTRIBUTION OF RESPONDENTS BY MENSTRUAL HISTORY

(N = 50)

Menstrual history	No. of respondents	Percentage (%)
Age at menarche (in years)		
11	10	20
12	16	32
13	16	32
14	7	14
15	1	2
Duration of menstruation (in days)		
3	25	50
4	2	4
5	11	22
6	3	6
7	9	18
Interval between menstrual cycle (in days)		
20 – 24	6	12
25 – 29	24	48
30 – 34	14	28
35 – 39	4	8
40 – 44	0	0
45 – 49	2	4

Data presented in table reveals that 32% of the respondents attained menarche at the age of 12 and 13 years respectively, 50% of the respondents had menstruation for a period of 3 days and 48% of the respondents had an interval of menstrual cycle between 25-29 days.

TABLE 4.3.
DISTRIBUTION OF RESPONDENTS BY NATURE OF BLEEDING

Nature of bleeding	No. of respondents	Percentage (%)
Mild	2	4
Moderate	40	80
Severe	8	16
Total	50	100

Among 50 samples, 80% of the students had moderate bleeding, 16% of the students had severe bleeding and 4% of the students had mild bleeding.

FIG. 4.3.
DISTRIBUTION OF RESPONDENTS BY NATURE OF BLEEDING

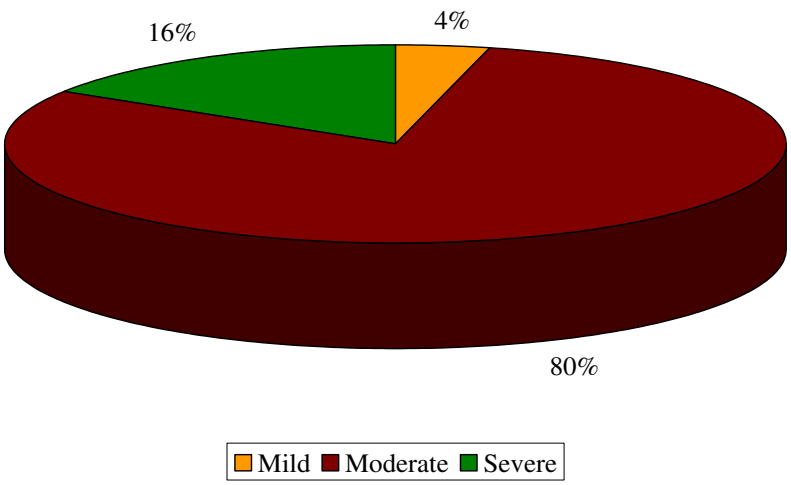


TABLE 4.4.
DISTRIBUTION OF RESPONDENTS BY ONSET OF PAIN

Onset of pain	No. of respondents	Percentage (%)
One day before	18	36
At the time of menstruation	32	64
Total	50	100

Data presented in table reveals that 36% of the students had pain one day before menstruation and 64% of the students had pain at the time of menstruation.

FIG. 4.6.
DISTRIBUTION OF RESPONDENTS BY DURATION OF PAIN

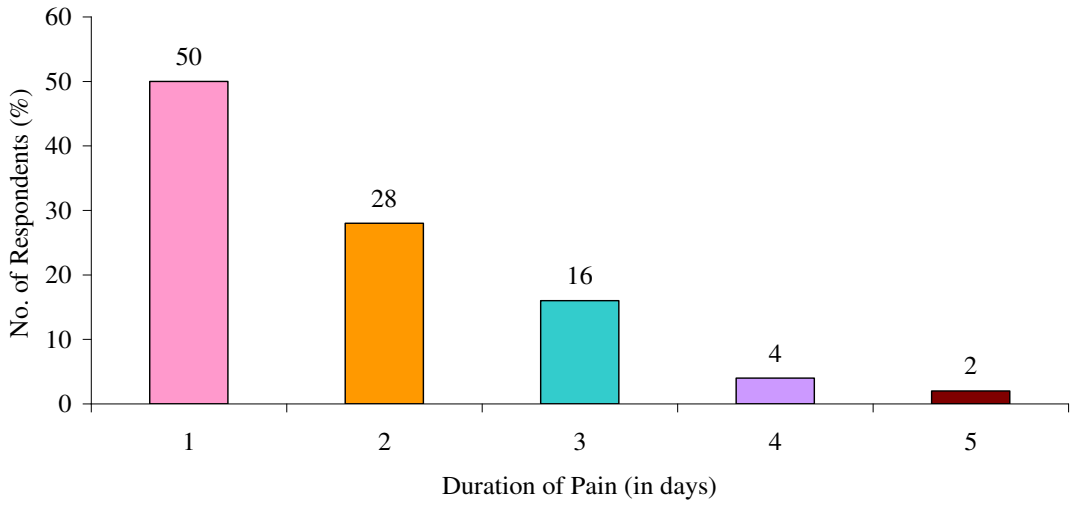


TABLE 4.5.
DISTRIBUTION OF RESPONDENTS BY SEVERITY OF PAIN

Severity of pain	No. of respondents	Percentage (%)
Mild	9	18
Moderate	24	48
Severe	17	34
Total	50	100

Data presented in table reveals that 48% of students had moderate pain, 34% of students had severe pain and 18% of students had mild pain.

FIG. 4.5.
DISTRIBUTION OF RESPONDENTS BY SEVERITY OF PAIN

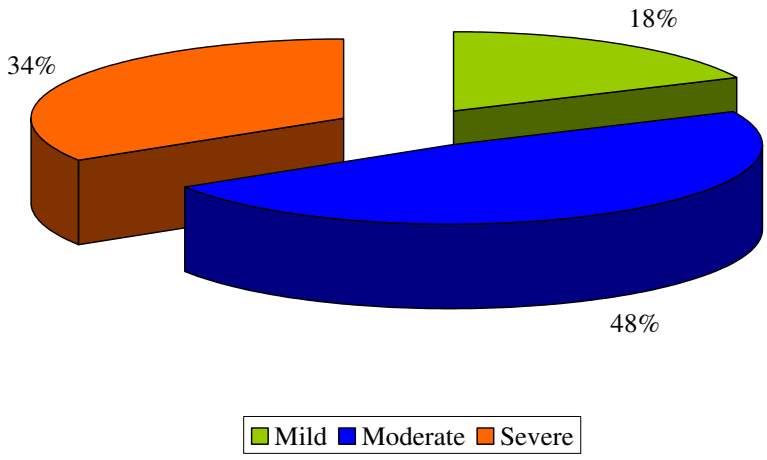


TABLE 4.6.
DISTRIBUTION OF RESPONDENTS BY DURATION OF PAIN

Duration of Pain (in days)	No. of respondents	Percentage (%)
1	25	50
2	14	28
3	8	16
4	2	4
5	1	2
Total	50	100

Data presented in table reveals that 50% of the students had pain only on first day, 28% of the students had pain till the second day, 16% of the students had pain till third day, 4% of the students had pain till the fourth day and 2% of the students had pain till the fifth day of menstruation.

FIG. 4.4.
DISTRIBUTION OF RESPONDENTS BY ONSET OF PAIN

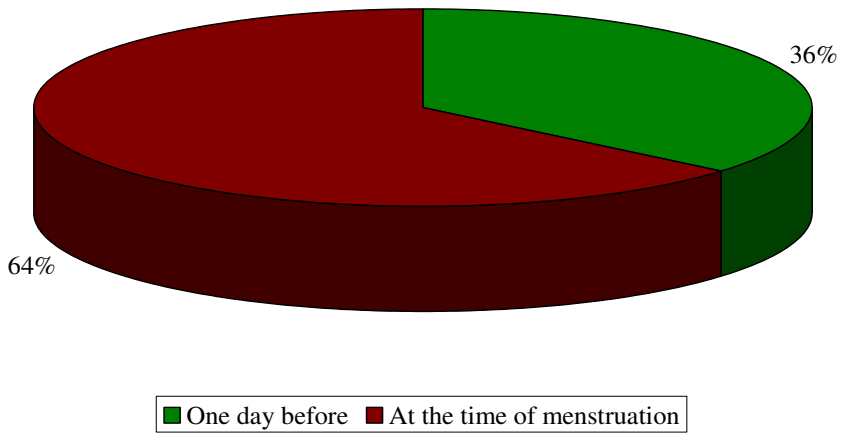


TABLE 4.7.
DISTRIBUTION OF RESPONDENTS BY ASSOCIATED SYMPTOMS OF DYSMENORRHOEA

(N=50)

Symptoms	No. of respondents	Percentage (%)
Vomiting		
Yes	8	16
No	42	84
Back ache		
Yes	39	78
No	11	22
Head ache		
Yes	12	24
No	38	76
Diarrhoea		
Yes	6	12
No	44	88
Constipation		
Yes	4	8
No	46	92

Distribution of respondents by menstrual history reveals that 16% of the respondents had vomiting, 78% of the respondents had backache, 24% of the respondents had headache, 12% of the respondents had diarrhoea and 8% of the respondents had constipation.

TABLE 4.8.
DISTRIBUTION OF RESPONDENTS BY PAST HISTORY

(N=50)

Past History	No. of respondents	Percentage (%)
Treatment taken for dysmenorrhea		
Yes	5	10
No	45	90
History of self medication		
Yes	2	4
No	48	96
Family history of dysmenorrhea		
Yes	19	38
No	31	62

Distribution of respondents by past history reveals that 10% of the respondents had taken treatment for dysmenorrhoea, 4% of the respondents had history of self medication and 38% of the respondents had family history of dysmenorrhoea.

SECTION – III

4.3. ANALYSIS ON EFFECTIVENESS OF ACUPRESSURE

Paired 't' test was used to analyse the effectiveness of acupressure.

TABLE 4.9.
COMPARISON OF PAIN SCORE BEFORE AND AFTER THE THERAPY

(N=50)

Group	Mean	Mean (%)	SD	Difference	't'
Before	5.76	57.6	2.123	4.36	21.121**
After	1.4	14	1.067		

** significant at 0.01

The table shows the computed mean and respective standard deviation of score obtained before and after application of therapy to the students. The data shows that from a mean score of 5.76, the score decreased to 1.4 with a mean difference of 4.36. The mean difference in total scores were analyzed, using paired 't' test.

The calculated 't' value 21.121 was greater than the table value (1.645) at 50 degree of freedom at 0.01 level of significance. Thus the hypothesis "there will be a significant difference in the level of pain before and after acupressure" is accepted.

SECTION – IV

4.4. ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND PAIN DURING MENSTRUATION

Chi-square was used to find the association between menstrual cycle interval and pain during menstruation.

TABLE 4.10.
ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND PAIN DURING MENSTRUATION

(N=50)

Demographic Variable	χ^2
Interval between menstrual cycle (in days)	14.03

The above results indicate the association of interval between menstrual cycle with pain during menstruation. The calculated χ^2 value is 14.03 and the table value is 18.5. Hence, there is a significant association between menstrual cycle interval and pain during menstruation.

RESULTS AND DISCUSSION

The present chapter reveals the results and discussion in detail. The analysed data is discussed under various sections.

5.1. FINDINGS RELATED TO MENSTRUAL HISTORY

5.1.1. Age at menarche

A study conducted by Sharma &Gupta (2003) among 96 girls of two different school of Dharan of the age group ranging from 11 to 17 years found that the average age of menarche was 12 years. The present study concluded that majority (i.e.) 32% of the respondents attained menarche in the age of 12 and 13 years respectively.

5.1.2. Duration of menstruation

Amita Singh (2008) conducted a study to assess the prevalence and severity of dysmenorrhoea among college students and concluded that 1.8% of the participants had bleeding for a duration of less than 2 days, 89.7% of the participants had bleeding for a duration of 3-7 days, 8.4% of the participants had a duration of bleeding for >8 days. The present study concluded that 50% of the respondents had menstruation for a duration of 3 days.

5.1.3. Duration of menstrual cycle

Amita Singh (2008) conducted a study to assess the prevalence and severity of dysmenorrhoea among college students and concluded that 4.6% of the participants had a menstrual cycle for less than 20 days, 80.3% of the participants had a menstrual cycle of 28-30 days, 12.1% of the participants had a menstrual cycle for 35 days, 2.8% of the participants had duration of menstrual cycle as >36 days. The present

study revealed that 48% of the respondents had duration of menstrual cycle as 25-29 days.

5.1.4. Nature of bleeding

Amita singh (2008) conducted a study to assess the prevalence and severity of dysmenorrhoea among college students and concluded that 12.1% of the participants had an amount of flow of < 30ml, 76.6% of the participants had an amount of flow of 30-100 ml, 11.2% of the participants had an amount of flow > 100ml. The present study revealed that 80% of the respondents had moderate bleeding, 16% of the respondents had severe bleeding and 4% of the respondents had mild bleeding.

Tokudaa (2007) conducted a study to investigate the epidemiology of dysmenorrhoea and concluded that 10.77% of the participants had head ache, 6.92% of the participants had back pain, 5.38% of the participants had fatigue, 51.5% of the participants used self medication and 7.7% of participants used complementary and alternative therapy.

Patil (2009) conducted a study to assess the nutritional problems and reproductive problems among the adolescent girls and reported that 14.2% of the participants had head ache, 11.3% of the participants had constipation and 16.9% of the participants had irregular menses. The present study results revealed that 16% of the respondents had vomiting, 78% of the respondents had backache, 24% of the respondents had headache, 12% of the respondents had diarrhoea, 8% of the respondents had constipation, 10% of the respondents had taken treatment for dysmenorrhoea, 4% of the respondents had history of self medication and 38% of the respondents had family history of dysmenorrhoea.

5.2. ANALYSIS ON EFFECTIVENESS OF ACUPRESSURE

Table 4.5. shows that 50 participants were assigned to acupressure. Pain intensity scores were assessed before and after application of acupressure using Numerical Pain Intensity Scale (Bram Riegel, 1998). The mean pain intensity score before acupressure was 5.76. After acupressure, the mean pain intensity scores was found to be 1.4. This reveals that there was pain reduction and 't' value was found to be 21.121. Hence, the hypothesis "There will be a significant difference in the level of pain before and after application of acupressure" is accepted. These results are in line with a study conducted by Eun HiJuna (2005) to find the 'effect of acupressure on dysmenorrhea and skin temperature changes in college students'. The results revealed that there is a significant difference in the severity of dysmenorrhoea. The pretest score was 8.04 which reduced to 0.032. Hence, it was concluded that acupressure to SP_6 meridian can be an effective non invasive nursing intervention for alleviation of dysmenorrhoea.

5.3. ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND PAIN DURING MENSTRUATION

Table 4.10. indicates that there is association between menstrual cycle interval and pain during menstruation. The calculated χ^2 value 14.03 and the table value 18.5, reveals that increase in interval between menstrual cycle will increase severity of pain.

SUMMARY AND CONCLUSION

The study was conducted with an objective to find out the effectiveness of acupressure on pain among nursing students with dysmenorrhea. Pressure on SP_6 and Li_4 point reduces the pain during menstruation. Numerical pain intensity scale was used to assess the pain before the intervention. Acupressure was applied for 25 minutes followed by the pain assessment. After the intervention numerical pain intensity scale was administered to reassess the pain intensity.

The present study was conducted at Sri Ramakrishna Institute of Paramedical Sciences, Women's Hostel, Coimbatore. Quasi experimental one group pretest-post test design was adopted for the present study. Convenient sampling technique was used to select samples. Total number of samples selected for the study was 50.

Numerical pain intensity (Bram Riegel, 1998) scale was used to assess the subjective pain score. The scale consists of sequence of numbers from 0 – 10 (mild to worst possible pain). This is a simple scale which requires the person to rate their level of pain intensity on a scale from no pain to pain as worst as possible. Acupressure was applied on the first day of menstruation for 25 minutes, at SP_6 and Li_4 points. After the intervention numerical pain intensity scale was administered to reassess the pain intensity.

To find out the effect of acupressure, paired 't' test was used. The result reveals that, there is a significant decrease in pain after acupressure.

6.1. MAJOR FINDINGS OF THE STUDY

1. The demographic data reveals that a maximum number of respondents, (ie) 34% of the students were in the age group of 19 years and 28% of them were II year B.Sc Nursing students.
2. Menstrual history reveals that 32% of the participants had attained menarche at the age of 12 and 13 years, 50% of the participants had duration of menstruation for 3 days, 48% of the participants had an interval of menstrual cycle between 25-29 days, 80% of the participants had moderate bleeding, 64% of the participants had pain at the time of menstruation, 48% of the participants had moderate pain, 50% of the participants had pain on first day of menstruation.
3. The results revealed that there is a significant difference in pain after the intervention.
4. The results revealed that there is association between menstrual cycle interval and pain during menstruation.

6.2. LIMITATIONS

1. The efficacy of acupressure could not be exactly determined since the participants have adapted to the nature of pain from their menarche.
2. There was an individual difference identified in onset of pain and perception of pain, that restricted uniformity in administration of intervention to all participants at the same time.

6.3. RECOMMENDATIONS

1. The study can be conducted in different settings with large samples.
2. A similar study can be conducted as a true experimental study.
3. A comparative study can be conducted between acupressure and pharmacological management.
4. A similar study can be conducted to identify the effect of acupressure in reducing discomforts, anxiety and emotional imbalance during menstruation.

6.4. SUGGESTION

Awareness programme can be conducted among women regarding complementary therapies for dysmenorrhea, since it is a cost effective, non invasive and simple technique.

6.5. NURSING IMPLICATIONS

6.5.1. Nursing Education

Acupressure helps to reduce pain during menstruation. It is an oldest Chinese traditional medicine, and it is a self care treatment for dysmenorrhoea. It is an effective and safe form of therapy for women with dysmenorrhoea. Since it is a component of complementary and alternative therapy, it can be included in nursing curriculum.

6.5.2. Nursing practice

Acupressure can promote the quality of life among women. Health education can be given to the women regarding the acu points and benefits of acupressure.

6.5.3. Nursing Research

The study has tested the effect of acupressure on pain among nursing students with dysmenorrhoea. More researches that could be carried out in this area would be beneficial. The effects of acupressure in reducing anxiety level could be studied.

6.6. CONCLUSION

The study was conducted to find the effectiveness on pain among nursing student with dysmenorrhoea. After the intervention, mean value and percentage of the pain score has significantly decreased from 57.6% to 14%. Hence, it can be concluded that the intervention is found to be effective in reducing the pain during menstruation.

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ANNEXURE - I

Paired 't' test

To test the hypothesis, 't' test was applied to findout the significant difference between before and after acupressure.

$$t = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}}$$

$$SD = \sqrt{\frac{\sum\left(d - \bar{d}\right)^2}{n}}$$

$\bar{d}$ = Mean of difference between pretest and post test score

SD = Standard deviation of the pre-test and post test score

n = Number of samples

ANNEXURE - II

χ^2 Analysis

To test the hypothesis, χ^2 was applied to findout the significant association between demographic variables and pain during menstruation.

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

O = Observed value

E = Expected value

APPENDIX – I

PERMISSION LETTER FOR CONDUCTING STUDY

From
M. Rekha,
II year M.Sc (Nursing),
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -641044.

To
Prof. SUGANTHI,
Hostel Administrator,
Sri Ramakrishna Institute of Paramedical Sciences, HOSTEL,
Coimbatore -641044.

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore - 641044.

Respected Sir/Madam,

Sub: Letter requesting permission for conduct the research study.

I, M.Rekha, II Year M.Sc (Nsg) student of Obstetrical and Gynaecological Nursing speciality as part of my educational requirement, I wish to conduct a research study on **"Application of acupressure on pain among nursing students with primary dysmenorhoea at Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore"**.

I will be thankful, if you allow me to conduct this research study. I will obey the rules and regulations.

Kindly grant me permission to do the study.

Thanking you

Yours faithfully,

(M. REKHA)

22-4-10

Coimbatore.

Seethala
PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044.

24/04/10

APPENDIX - II
LETTER REQUESTING TO VALIDATE THE RESEARCH TOOL AND CONTENT

From
M. Rekha,
M.Sc Nursing II year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To
Mrs. Baby
Principale
Karpagam College of Nursing.

Sub: Requisition for tool Validation –reg.

Respected Sir,

I have selected a project work topic entitled, **"APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE"** for the requirement of M.Sc Nsg Degree, the following tools are tend to be used. Hence, I request you to kindly give valuable suggestion and necessary modification in the same.

Thanking you,

Yours faithfully,

(M.REKHA)

PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

FORMAT FOR CONTENT VALIDITY

Name of the expert : PROF. S. BABY

Address : KARPAGAM NURSING COLLEGE,
S.F.NO. 770, 763,
OTHAKKALMANDAPAM,
COIMBATORE-32.

Total content for the tool : Adequate/ Inadequate can add some more content.

Kindly validate each tool and tick wherever applicable.

Sl. No.	No. of tool selection	Strongly agree	Agree	Need modification	Remarks
1.	Section – 1 Demogra. data			✓	can add some more data.
2.	Section – 2 Pain Ass. scale		✓		
3.	Section – 3 Procedure		✓		
4.	Section – 4				
5.	Section – 5				

Date: 4.6.10.

S. Baby

Signature of the Expert

Principal
Karpagam Nursing College
Coimbatore - 641 032

From
M. Rekha,
M.Sc Nursing II year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To
Mrs. Jhansi Sundari, M.Sc (N)
Associate Professor,
P.S.G College of Nursing,
Coimbatore.

Sub: Requisition for tool Validation –reg.

Respected Sir,

I have selected a project work topic entitled, **"APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE"** for the requirement of M.Sc Nsg Degree, the following tools are tend to be used. Hence, I request you to kindly give valuable suggestion and necessary modification in the same.

Thanking you,

Yours faithfully,

(M. REKHA)

FOR PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044.

FORMAT FOR CONTENT VALIDITY

Name of the expert : Mrs. F.K. Johnsy Sundari

Address : Associate professor,
PSG CON,
Coimbatore - 4.

Total content for the tool : ✓ Adequate/ Inadequate

Kindly validate each tool and tick wherever applicable.

Sl. No.	No. of tool selection	Strongly agree	Agree	Need modification	Remarks
1.	Section – 1		✓		
2.	Section – 2		✓		
3.	Section – 3		✓		
4.	Section – 4		✓		
5.	Section – 5		✓		

Date: 11/5/10.

Signature of the Expert

From
M. Rekha,
M.Sc Nursing II year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To
Mrs. Renuka,
Associate Professor,
Dept. of Maternity Nursing,
KMCH College of nursing.

Sub: Requisition for tool Validation –reg.

Respected Sir,

I have selected a project work topic entitled, **"APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE"** for the requirement of M.Sc Nsg Degree, the following tools are tend to be used. Hence, I request you to kindly give valuable suggestion and necessary modification in the same.

Thanking you,

Yours faithfully,

(M. REKHA)

PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

FORMAT FOR CONTENT VALIDITY

Name of the expert : MRS. S. RENUKA.

Address : ASSOCIATE PROFESSOR
Dept. of OBG NURSING
KMCH COLLEGE OF NURSING
KMCH CAMPUS
AVINASHI ROAD
COIMBATORE - 14

Total content for the tool : ✓ Adequate/ Inadequate

Kindly validate each tool and tick wherever applicable.

Sl. No.	No. of tool selection	Strongly agree	Agree	Need modification	Remarks
1.	Section – 1		✓		
2.	Section – 2		✓		
3.	Section – 3		✓		
4.	Section – 4		✓		
5.	Section – 5		✓		

Date: 3/6/20

S Renuka
Signature of the Expert

From
M. Rekha,
M.Sc Nursing II year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To
Mrs Annaporani,
Associate professor,
RVS College of Nursing
Coimbatore.

Sub: Requisition for tool Validation –reg.

Respected Sir,

I have selected a project work topic entitled, **"APPLICATION OF ACUPRESSURE ON PAIN AMONG NURSING STUDENTS WITH DYSMENORRHOEA AT SRI RAMAKRISHNA INSTITUTE OF PARAMEDICAL SCIENCES, COIMBATORE"** for the requirement of M.Sc Nsg Degree, the following tools are tend to be used. Hence, I request you to kindly give valuable suggestion and necessary modification in the same.

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PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

FORMAT FOR CONTENT VALIDITY

Name of the expert : MRS. B. ANNAPOORANI.

Address : RVS CON.

Total content for the tool : Adequate/ Inadequate .

Kindly validate each tool and tick wherever applicable.

Sl. No.	No. of tool selection	Strongly agree	Agree	Need modification	Remarks
1.	Section – 1				
2.	Section – 2				
3.	Section – 3				
4.	Section – 4				
5.	Section – 5				

Remarks: This study has been published in the Nightingale Nursing times journal in the year 2009-10. So to modify the study she can used one more acupressure point for pain reduction.*

Add ST44 - point between the second & third toe.

Date:

Signature of the Expert

B. Annapoorani

31/5/10

APPENDIX –III

MATERIALS FOR DATA COLLECTION

I. SOCIO DEMOGRAPHIC CHARACTERISTICS

Sample No. :

Age :

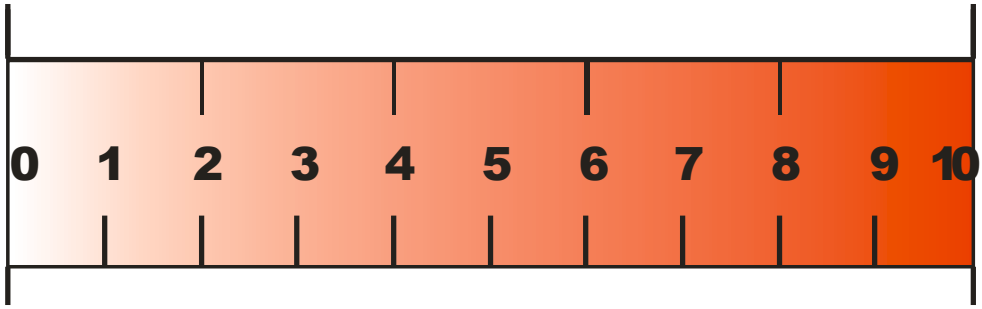
Marital Status :

Placement B.Sc (Nursing) :

II. MENSTRUAL HISTORY

1. Age at menarche :
2. LMP :
3. Duration of menstruation :
4. Interval between menstrual cycle :
5. Nature of bleeding :
6. Abdominal pain :
   - (i) Onset of pain :
   - (ii) Duration of pain :
   - (iii) Severity of pain :
7. Vomiting : Yes/No
8. Back ache : Yes/No
9. Head ache : Yes/No
10. Diarrhoea : Yes/No
11. Constipation : Yes/No
12. Treatment taken for dysmenorrhoea : Yes/No
13. History of self medication : Yes/No (If yes details _____)
14. Family history of dysmenorrhoea :

0-10 NUMERICAL PAIN INTENSITY SCALE



No pain — Worst possible pain

0 - No pain

1-3 - Mild Pain

4-6 - Moderate pain

7-9 - Severe pain

10 - Worst possible pain

PAIN SCORE

NUMERICAL PAIN INTENSITY SCALE

Pain scale	**Score**	**Day 1**	
		Pretest	**Posttest**
No pain			
Mild pain			
Moderate pain			
Severe pain			
Worst possible pain			

APPENDIX – IV

Acupuncture Foundation & Research Centre
Coimbatore - 641 012

(INSTITUTE OF ACUPUNCTURE AND LASER THERAPY)

AFFILIATED TO

MEDICINA ALTERNATIVA

(ESTD 1962 - AT ALMA ATA USSR)

(THE OPEN INTERNATIONAL UNIVERSITY FOR COMPLEMENTARY MEDICINES)

COLOMBO - SRILANKA

Certificate

This Diploma is awarded to Ms. Rekha. M

Having Successfully Completed the Course and Examination in Acupressure Magneto Therapy Theory and Practice In Witness where of the Said Institution has Caused its Common seal to be affixed.

V.R.

Chairman

Founder Director

Examiner

ACUPUNCTURE FOUNDATION & RESEARCH CENTRE
145, IInd Street (Extension)
Gandhipuram,
COIMBATORE - 641 012

No. 437

Date 20.1.010